



COLLEGE of  
BIOLOGICAL SCIENCE

DEPARTMENT OF MOLECULAR  
AND CELLULAR BIOLOGY

**Announcement:**

All interested members of the university community are invited to attend  
the Final Oral Examination for the degree of **Master of Science** of

**MATIYO OJEHOMON**

on Thursday, April 9, 2020 at 9:30 a.m.

**Thesis Title:** Insertional vs targeted mutagenesis in the development of zebrafish  
as an *in vivo* model for cardiomyopathy

**Examination Committee:**

Dr. J. Vessey, Dept. of Molecular and Cellular Biology (Exam Chair)  
Dr. J. Dawson, Dept. of Molecular and Cellular Biology  
Dr. T. Van Raay, Dept. of Molecular and Cellular Biology  
Dr. S. Alderman, Dept. of Integrative Biology

**Advisory Committee:**

Dr. John Dawson (Adv)  
Dr. T. Van Raay

**Abstract:** Heart failure is a global economic burden and can be caused by cardiomyopathy, a disease of the myocardium. Mutations in genes encoding sarcomere proteins have been known to cause cardiomyopathy. One of these sarcomere proteins is  $\alpha$ -cardiac actin (ACTC), a small, conserved, filamentous protein needed for proper contraction of the heart. To better understand how mutations in the ACTC protein cause cardiomyopathy, an *in vivo* model can be used to understand the molecular mechanism that occurs. Due to its advantages, zebrafish has emerged as a model organism for cardiovascular research. Using transposons (insertional) or Clustered Regularly Interspaced Palindromic Repeats (CRISPR) (targeted), zebrafish can be engineered to carry these mutations and the impact can be studied. The transposon system proved to be unstable as the inserted transposon underwent transcriptional repression. To use the CRISPR system, identifying which *zfactc* gene to target is necessary. Performing Whole Mount *In Situ* Hybridization and RT-qPCR, *zfacta1b* seems to be the best candidate for targeted mutagenesis due to its early expression in the heart.

**Curriculum Vitae:** Mati obtained her Bachelor of Science (Hons.), Biochemistry (co-op program), at the University of Guelph in 2015. She then began her M.Sc. in the lab of Dr. John Dawson in September 2017.

**Publications:** Ojehomon, M., S.L. Alderman, L. Sandhu, S. Sutcliffe, T. Van Raay, T.E. Gillis, and J.F. Dawson. 2018. Identification of the *actc1c* cardiac actin gene in zebrafish. *Prog. Biophys. Mol. Biol.* 1–6. doi:10.1016/J.PBIOMOLBIO.2018.06.007.

Avey, S.R., M. Ojehomon, J.F. Dawson, and T.E. Gillis. 2018. How the expression of green fluorescent protein and human cardiac actin in the heart influences cardiac function and aerobic performance in zebrafish *Danio rerio*. *J. Fish Biol.* 92:177–189. doi:10.1111/jfb.13507.